

Dr. James Moser, Pro. Phys. Soc. 4, 1881, p. 348; C. E. Fritts, Pro. A. A. S., 33, 1884, p. 97; Scientific American Supplement, June 6, 1885, p. 7854; Bidwell, Phil. Mag. (5) 5, 1881, p. 302; 15, 1883, p. 31; 13, 1882, p. 347; 40, 1895, pp. 233-256; Pro. Phys. Soc. 7, 1885, p. 129; 13, 1894, pp. 552-579; W. von Uljanin, Thesis published in Moscow, entitled *Ueber die bei der Beleuchtung entstehende Electromotorische Kraft im Selen*; Morize, Am. Met. Jour. vol. 2, p. 2.

### OBSERVATIONS AT HONOLULU.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, the monthly report of meteorological conditions at Honolulu is now made nearly in accordance with the new form, No. 1040, and the arrangement of the columns, therefore, differs from those previously published.

#### Meteorological observations at Honolulu.

MARCH, 1899.

The station is at 21° 18' N., 157° 50' W.  
Pressure is corrected for temperature and reduced to sea level, and the gravity correction, -0.06, has been applied.  
The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, connected by a dash, indicate change from one to the other.  
The rainfall for twenty-four hours is now given as measured at 1 p. m. Greenwich time on the respective dates.  
The rain gauge, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m.. Greenwich time, or 2:30 a. m., Honolulu time, of the respective dates.									
		Dry bulb.	Wet bulb.	Temperature.		Means.		Wind.		Total rainfall.	Average cloudi-ness.	Sea-level pressures.	
				Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.			Maximum.	Minimum.
1	30.05	71	77	73	70	62	64	nne.	4.6	0.02	7	30.09	30.09
2	30.01	71	64.5	77	70	59.5	64	ne.	3	0.09	10	30.08	30.08
3	30.01	64	68	79	69	63.3	71	nne.	2.0	0.00	4	30.03	30.03
4	30.02	60	59	79	69	64.0	73	w-n.	2.0	0.00	2-7	30.03	30.03
5	30.00	71	65	78	68	61.3	73	ne.	0.3	0.00	9	30.03	30.03
6	30.06	69	65	77	68	62.3	72	nne.	4.6	0.05	8-10	30.08	30.08
7	30.05	69	68	79	69	67	73	nne.	4.0	1.68	10	30.04	30.04
8	30.00	65	68	75	65	61.3	71	ne.	3.0	0.08	6	30.00	30.00
9	30.06	65	64	79	64	63.7	78	ne.	2	0.13	6	30.09	30.09
10	30.09	65	64	80	65	64.0	81	se.	2	0.00	5	30.04	30.04
11	30.08	67	66	81	64	66.5	84	se.	2	0.08	4	30.08	30.08
12	30.06	68	67.5	81	66	66.5	81	s.	0.2	1.68	8-10	30.00	30.00
13	30.08	70	69	79	68	68.3	88	s-w.	1	0.16	10-7	30.03	30.03
14	30.04	72	68	78	69	68.3	84	se-ne.	0.3	0.06	10-4	30.09	30.09
15	30.06	69	64.5	80	70	67.7	74	ne.	0.3	0.00	10-4	30.10	30.10
16	30.07	62	61.5	78	69	64.0	73	ne.	3	0.00	6-8	30.11	30.11
17	30.03	69	64.5	80	62	62.3	75	ne.	3	0.00	4-8	30.09	30.09
18	30.00	66	64	79	69	63.5	73	e-se.	3.1	0.00	3-10	30.06	30.06
19	30.02	68	67	80	64	65.5	79	sw-w.	2	0.04	6	30.01	30.01
20	30.03	61	59	77	67	68.3	73	ne-s-w.	1	0.00	8-10	30.06	30.06
21	30.07	58	57.5	79	58	59.7	70	wnw.	1.3	0.00	5	30.06	30.06
22	30.04	60	56.5	80	58	57.3	74	wnw.	2.4	0.00	4-9	30.04	30.04
23	30.04	64	57	75	57	55.7	68	n.	2	0.00	6	30.00	30.00
24	30.06	61	59	77	61	54.3	62	n-se.	1	0.00	4-9	30.02	30.02
25	30.00	66	65	77	59	61.7	76	s.	1.1	0.04	7-9	30.06	30.06
26	30.02	68	68.5	80	62	65.3	75	s-sw.	1.5	0.00	5	30.02	30.02
27	30.06	68	68	81	64	64.3	73	e-ne.	0.00	0.00	3	30.06	30.06
28	30.06	73	66	82	67	66.5	76	ne.	0.00	0.00	3	30.12	30.12
29	30.05	72	65	79	72	64.0	66	ene.	0.02	0.02	3	30.13	30.13
30	30.05	72	65	80	71	61.7	65	ne.	0.01	0.01	4	30.11	30.11
31	30.05	73	68.5	80	69	62.0	62	ne.	0.00	0.00	2	30.12	30.06
Sums..									4.94				
Means.	29.973	67.0	61.4	78.5	65.4	62.9	74.1				5.8	30.033	29.940
Departure..	-0.005			+0.5	+0.5	+2.0	+2.8			+0.78	+1.9	-.005	-.005

Mean temperature for March, 1899 (6+2+9)+3=71.2°; normal is 70.7°. Mean pressure for March is 29.987; normal is 29.982.  
\*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4:30 p. m., Greenwich time. ‡These values are the means of (6+9+2+9)+4. §Beaufort scale.

### METEOROLOGY OF THE YUKON.

Mr. U. G. Myers, Observer, Weather Bureau, who has been

spending a year in Alaska on a furlough, sends a copy of a meteorological record made by him at Dawson City (N. 65° 5', W. 139° 30'; elevation about 1,100 feet above sea level), during November and December, 1898, and January, 1899. Mr. Myers made a daily reading of the barometer and maximum and minimum thermometers, and noted the character of the day. Dawson is about 75 miles southeast of the Weather Bureau station at Eagle (N. 64° 45', W. 141° 8').

The following is a summary of his observations:

Month.	Temperature.						Total snowfall.	Depth of snow on ground.		Number of days—			Prevailing direction of wind.	
	Maximum.	Date.	Minimum.	Date.	Mean maximum.	Mean minimum.		Mean (max. and min.).	On 15th.	At end of month.	Clear.	P. cloudy.		Cloudy.
1898,	°		°		°	°	°	<i>Ins.</i>	<i>Ins.</i>	<i>Ins.</i>				
November *....	23.3	13	-41.4	19	-10.9	-17.8	-14.4	.....	3.0	12.0	10	8	12	n.
December.....	22.0	6	-41.0	31	3.5	-7.9	-2.2	10.0	18.0	22.0	16	12	3	n.
1899,														
January .....	2.0	21	-45.0	25	-15.7	-27.2	-21.4	6.0	24.0	38.0	11	4	16	n.

\* For 29 days.

November, 1898: Yukon closed at 9 p. m. on the 3d. Snow-fall on the 10th, 24th, and 26th.

December, 1898: Light rain for a few minutes during afternoon of the 6th. Light snow fell on the 1st, 2d, 3d, 14th; heavy snow on the 15th, 22d, and 24th.

January, 1899: Light snow on 9th; heavy snow on 28th.

### SNOW ROLLERS.

By A. H. THIESSEN, Observer Weather Bureau.

As a slight contribution to the literature of natural snowballs the following will be of interest.

Mr. Walker, a voluntary observer at Dearborn Canyon, Mont., sent in the following remark with his January report:

On the 27th at 9 a. m. a high west wind began blowing that caused the moist snow to roll along the ground and form large snowballs, until the fields and pastures looked as if Mother Nature had been amusing herself on a large scale.

Mr. Walker has since been in the Helena office and a more detailed description has been secured. The scene of this phenomenon was a rolling field. Six inches of very light snow fell the day before. At the time of the phenomenon the observer judged that the temperature was about at the freezing point. The wind was blowing a gale, estimated at 40 miles per hour. The snow was lifted up in sheets before it began to roll, just as one would roll a sheet of paper. The balls were of all sizes, and were formed on the up-grade as well as on the down. They were even forced over a small knoll and were then assisted by a gravity into a hollow where many were collected. No very reliable data could be obtained as to structure. The small balls were spherical and the larger ones were cylindrical. There was also a hole through the center three to six inches in diameter. Later in the day a chinook reached the station dissipating the snow and leaving these monuments for awhile showing what rare and singular conditions may occur in nature.

### RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined list of titles has been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index

of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

*Ciel et Terre, Bruxelles, 20me année.*

St. Hepites. Climatologie du littoral roumain de la mer Noire. [Concluded.] P. 49.

*Comptes Rendus, Paris, Tome 128.*

Gautier, A. L'iode existe-t-il dans l'air? P. 643.

" Quantité maximum de chlorures contenus dans l'air de la mer. P. 715.

*Das Wetter, Berlin, 16 Jahrg.*

Plumondon, J. R. Der Regen. [Concluded.] P. 65.

Barthe, O. Synodischer Mondumlauf und Temperatur. P. 61.

*Journal of the Franklin Institute, Philadelphia, Vol. 147.*

Haupt, H. The Problem of the Mississippi. P. 297.

*Meteorologische Zeitschrift, Wien, Band 16.*

Hergesell, H. Ergebnisse der internationalen Ballonfahrten. P. 49.

Kohlbrugge, J. H. F. Meteorologische Beobachtungen zu Tosari. (Java.) [Concluded.] P. 63.

Streit, A. Wolkenstudien bei dem Hagelgewitter am 1 Juni 1898 über Wien. P. 76.

Hann, J. Zum Klima der Anden von Argentinien. P. 83.

*Nature, London, Vol. 59.*

Milne, J. Seismological Observatory and its Objects. Pp. 487 and 579.

Callendar, H. L. Measuring Extreme Temperatures. P. 494.

*Naturwissenschaftliche Rundschau, Braunschweig, 14 Jahrg.*

Schwalbe, G. Ueber die jährliche Variation der erdmagnetischen Kraft. P. 145.

*Philosophical Magazine, London, Vol. 47.*

Rayleigh, Lord. Transmission of Light through an Atmosphere Containing Small Particles in Suspension, and the Origin of the Blue of the Sky. P. 375.

Wood, R. W. Some Experiments on Artificial Mirages and Tornadoes. P. 349.

*Scientific American, New York, Vol. 80.*

—Some New Kite Experiments at Bayonne. [Made by W. A. Eddy.] P. 213.

Morton, H. Liquid Air as a New Source of Power—Another Engineering Fallacy. P. 245.

*Scientific American Supplement.*

Meyers, C. E. Dirigible Air Vessels. P. 19,457.

—The Mont Blanc Meteorological Observatory. P. 19,469.

*Southern Farm Magazine, Baltimore, Vol. 7.*

McAdie, A. G. Frosts and Freezes. Results of Experiments on Protection of Citrus Fruit at the Bradish-Johnson Estate, Woodland, La. P. 12.

*Symons Meteorological Journal, London, Vol. 34.*

Symons, G. J. Extremes of Temperature in London and its Neighborhood for 104 years.

*Terrestrial Magnetism, Cincinnati, Vol. 4.*

Elster, J. und Geitel H. Beobachtungen über die Eigenelectricität der atmosphärischen Niederschläge. P. 15.

Bauer, L. A. Physical Decomposition of the Earth's Permanent Magnetic Field. No. 1. The Assumed Normal Magnetization and the Characteristics of the Resulting Residual Field. P. 33.

### UTILIZATION OF FOG.

By A. McL. HAWKS, Civil Engineer, Tacoma, Wash.

Before attempting to discuss this in a general way, let us look at it in some specific case. I spent March to May of 1898 in San Diego. The country was absolutely arid; no rain of import had fallen in eighteen months, the streams were dry, the huge reservoirs almost empty, ranches were barren, wheat fields burnt up, cattle driven out of the State, fruit trees dying for lack of water. And yet almost every evening (I think safely three out of five) tons upon tons of water rolled in from the ocean over the land; hung there all night long, only to evaporate in the a. m., with the parched land almost as thirsty as before its visit. Perhaps in that "almost" we will find the clue to the solution of the problem.

The diurnal cycle usually reads thus: At about 10 a. m. a sea breeze springs up, blowing 12 to 20 miles per hour from the west, with the sun shining as it only can shine in the arid countries; at 5 p. m. the breeze falls until by 6 p. m. it is usually gone so entirely that the sailors' method of licking a finger

to detect the direction of the wind fails to find any stirring. As the breeze dies down a bank of fog forms out over the ocean and rolls shoreward. This is usually about 500 feet deep, and when it strikes Point Loma dashes up into the air like spray from a rock. Long after the wind dies out the fog continues to roll inland until it finally reaches the hills at 1,000 to 1,500 feet elevation and 25 to 40 miles inland. Rarely in the early evening does it climb to the summits of these hills (2,000 to 3,000 feet elevation), though usually it rolls over them before morning.

By 8 p. m. the grass is quite wet (as if a shower of, say, ten minutes duration had passed over), the bushes commence to become damp, and various other objects compel condensation in various degrees. Shiny black painted iron is one of the best gatherers of moisture which I noticed; objects of the same kind varied according to their position. For instance, the house in which I lived was painted while I was there and immediately became a great moisture gatherer; the front steps had become "cupped" through the warping influence of the sun before they were dry; after painting they held a pool of water each morning. The banisters or hand rail (at an angle of, say, 30°) collected about as well as the steps, but the uprights scarcely at all. A foot inside the rail of the piazza no precipitation occurred. One's hair would collect considerable moisture, especially curly hair. Glass, upright, almost no effect; at an angle of 45°, on both sides of the glass. The bare earth almost no effect, and yet in little depressions often the surface would be quite damp and darkened by moisture. Does not this fog condensation follow similar lines to those observed and reported in the Journal of the Franklin Institute, about 1876.

All night long this fog bank lies over the land. Soon after sunrise, generally about 8 a. m., the breeze springs up from the west and by 10 a. m. the conditions are exactly the same as on the preceding day.

You have suggested in your comments (I think it was the MONTHLY WEATHER REVIEW for October, 1898, p. 466) that some mechanical means might be employed to condense or collect the moisture. It appears to me that would be too expensive and hardly practicable. Will not the same conditions obtain under the tree as under the piazza roof? In fact they do obtain to a great extent, as the soil near the base of a sizable citrus tree is never wet by the fog. If you could persuade the citrus to grow with its leaves all aslant downward, so as to collect and drip, something might be done. I do not believe any sort of upright surface would aid in collecting moisture.

With all the conditions as they are on these foggy nights, might not something of value be expected if liquified air were liberated? Engineering News figures out from Trippler's data that one gallon of liquified air could be manufactured (in considerable quantities, of course) for 15 cents; its chief difficulty at present is transportation; given the assurance of commercial success and every city with an ice plant will change the latter into a liquid air plant.

There may be two ways of utilizing this liquid: First, in a similar manner to the protection of gardens against frost by making a smudge and allowing the smoke to cover the ground. With everything so favorable that a slight condensation is already taking place, will not the additional cold liquid carry this work on more rapidly? The evaporation will take up the heat, but if simply allowed to evaporate it seems to me the cold area (from the expansion of the liquid air) will gradually spread. One gallon of liquid air equals about 100 cubic feet of atmosphere. If 100 gallons were expanded (at a cost of \$15) is it not reasonable to suppose it might cover an orchard of 5 acres? The second method is dependant upon an entirely different course; the facts are not ascertainable absolutely but are reasonably true. If there is a lower stratum